NATURAL RESOURCES CONSERVATION SERVICE

CONSERVATION PRACTICE STANDARD

WASTE UTILIZATION

(Acre)

CODE 633

DEFINITION

Using agricultural wastes such as manure and wastewater or other organic residues.

PURPOSES

- Protect water quality
- Provide fertility for crop, forage, fiber production and forest products
- Improve or maintain soil structure;
- Provide feedstock for livestock
- Provide a source of energy

CONDITIONS WHERE PRACTICE APPLIES

This practice applies where agricultural wastes including animal manure and contaminated water from livestock and poultry operations; solids and wastewater from municipal treatment plants; and agricultural processing residues are generated, and/or utilized. *It does not apply to detailed design criteria or construction specifications for individual structures or components of waste transfer or application systems.*

CRITERIA

General criteria applicable to all purposes

All federal, state and local laws, rules and regulations governing waste management, pollution abatement, health and safety shall be strictly adhered to. The owner or operator shall be responsible for securing any and all required permits or approvals related to waste utilization, and for operating and maintaining any components in accordance with applicable laws and regulations. *Individual waste transfer or application components or facilities shall be designed and constructed according to appropriate NRCS standards and specifications.*

Use of agricultural wastes shall be based on at least one *site specific* analysis of the material during the time it is to be used. *If agricultural waste use is regulated, Texas Natural Resource Conservation Commission (TNRCC) sampling guidelines will be followed. Initial planning may be based on waste characteristic values in the NRCS, Agricultural Waste Management Field Handbook (AWFHB), published research or extension data, or university testing laboratory results. If annual waste analyses vary from previous analyses, application rate will be adjusted accordingly.* In the case of daily spreading, waste shall be sampled and analyzed at least once each year*. As a minimum waste analyses should identify total nitrogen, total phosphorus, and total potassium. Solid waste analyses should additionally identify moisture content.*

Information on collecting effluent and manure samples for analysis can be found in the Texas Agricultural Extension Service (TAEX) Publication, No. L-5175, Managing Crop Nutrients Through Soil, Manure, and Effluent Testing.

If metal content of municipal wastewater, sludge, septage, and agricultural waste is a concern, the analysis shall include the concentration of metals in the material. The single application or lifetime limits of heavy metals shall not be exceeded (see TNRCC guidance for further information).

If the annual effluent or solid application does not meet recommended requirements, supplemental nutrients from commercial fertilizer nitrogen (N), phosphorus, (P_2O_5) and potassium (K_2O) will be applied to achieve the planned yield goals.

Effluent and/or solids will be injected or surface applied uniformly.

Where agricultural wastes are to be spread on land not owned or controlled by the producer, the waste management plan, as a minimum, shall document the amount of waste to be transferred and who will be responsible for the environmentally acceptable use of the waste.

Records of the use of wastes shall be kept a minimum of five years as discussed in OPERATION AND MAINTENANCE, below.

Additional criteria to protect water quality

All agricultural waste shall be utilized in a manner that minimizes the opportunity for contamination of surface and ground water supplies. *Timing of waste application will correspond to crop nutrient demand, when feasible. When agricultural waste is applied, the maximum annual or biennial application rate will not exceed the rates stated in the practice standard Nutrient Management (590).*

Solid waste should only be applied when soil conditions are such that soil compaction will be minimized.

When liquid wastes are applied, the *maximum hourly* application rate shall not exceed the infiltration rate of the soil, and the amount of waste applied shall not exceed the moisture holding capacity of the soil profile at the time of application. *The m**aximum hourly application rate** is determined by the texture of the soil layer with the lowest permeability within the upper 24 inches of the predominant soil in each field. The hourly application rate must be low enough to avoid runoff and/or ponding. For effluent with 0.5% solids or less application rates should not exceed those shown in AWMFH, Table 11-2. If effluent contains more than 0.5% solids Table 11.2 values must be reduced by the appropriate value shown in AWMFH, Table 11.3. The **Maximum One Time Application** of effluent is the amount that will bring the top 24 inches of the soil to 100% of field capacity, which is the maximum amount of water that can be held by the soil against the forces of gravity. The field capacity of the upper 24 inches of the predominant soil in each field should be used. The Texas, NRCS, job sheet entitled: "Waste Utilization, Determining Effluent Application Rates" can be used to document these determinations.*

Agricultural waste shall not be land-applied on soils that are frequently flooded, as defined by the county Soil Survey.

Wastes shall not be applied to saturated, frozen or snow-covered ground. Wastes will not be applied during rainfall events, unless a storage structure is in imminent danger of overflow.

A minimum 100 ft. vegetated buffer (Filter Strip, Field Border, Riparian Forested Buffer, etc.) will be maintained between the application area and all surface water bodies, sink holes and watercourses as designated on Soil Survey sheets, or USGS topographic maps. A minimum application distance from private or public wells will be 150 ft. and 500 ft. respectively.

Wastes will not be applied to slopes steeper than 8%, unless it is being applied as a component of an erosion control plan, i.e., roadside stabilization, Critical Area Planting (342), reclamation work, etc.

If land application of animal mortality residues is planned, a description of planned routine and catastrophic mortality management activities will be included in the Waste Utilization Plan. See TNRCC rules for additional information.

Additional criteria for providing fertility for crop, forage, fiber production and forest products

Where agricultural wastes are utilized to provide fertility for crop, forage, fiber production, and forest products, the practice standard Nutrient Management (590) shall be followed.

Where municipal wastewater and solids are applied to agricultural lands as a nutrient source, the single application or lifetime limits of heavy metals shall not be exceeded *(see TNRCC guidance for further information).* The

concentration of salts shall not exceed the level that will impair seed germination or plant growth.

Additional criteria for improving or maintaining soil structure

Wastes shall be applied at rates not to exceed *the maximums stated in Nutrient Management 590,* or salt concentrations as stated above, and shall be applied at times the waste material can be incorporated by appropriate means into the soil within 72 hours of application.

Additional criteria for providing feedstock for livestock

Agricultural wastes to be used for feedstock shall be handled in a manner to minimize contamination and preserve its feed value. Chicken litter stored for this purpose shall be covered. *Refer to TAES Publication Number MP-1773, Feeding Broiler Litter to Beef Cattle, other TAES or TAEX publications, or secure the services of a qualified animal nutritionist to develop rations which utilize wastes.*

Additional criteria for providing a source of energy

Use of agricultural waste for energy production shall be an integral part of the overall waste management system.

All energy producing components of the system shall be included in the waste management plan and provisions for utilization of residues of energy production identified.

Where the residues of energy production are to be land-*applied to protect water quality, provide* for crop nutrient use or *improve* soil conditioning, the criteria listed above shall apply.

CONSIDERATIONS

The effect of Waste Utilization on the water budget should be considered, particularly where a shallow ground water table is present or in areas prone to runoff. Limit waste application to the volume of liquid that can be stored in the root zone.

Guidance on estimating soil moisture can be found in NRCS Program Aid 1619; "Estimating Soil Moisture by Feel and Appearance"; National Engineering Handbook Section 652, National Irrigation Guide, Chapter 15, Part 652.1505, or other similar publications.

Land application of waste should normally be made at appropriate times to meet crop needs. Application can, however, be made at any time as long as the total annual (or biennial) nutrient application rate, maximum hourly application rate, and maximum one time application rate are not exceeded, and soil conditions are suitable for application.

When excess waste is removed for application off-site, the producer should provide a copy of the most current waste analysis and a Waste Utilization Job Sheet to the contract hauler or the individual receiving the waste.

Where natural leaching does not occur, salt content of utilized wastewater, must be considered. If sufficient salts are present to cause salinity problems, liquid wastes should be diluted with good quality water or waste application volumes limited.

Minimize the impact of odors of land-applied wastes by making application at times when temperatures are cool and when wind direction is away from neighbors.

Effluent should not be applied at night unless the application system is automated and equipped with one or more fail safe devices which would shut down the system, and/or prevent over application, runoff, and off site application.

The use of windbreaks as visual screens or to enhance or redirect air movement around facilities and storage structures is encouraged.

Agricultural wastes contain pathogens and other disease-causing organisms. Wastes should be utilized in a manner that minimizes their disease potential.

Priority areas for land application of wastes should be on gentle slopes located as far as possible from waterways. When wastes are applied on more sloping land or land adjacent to waterways, other conservation practices should be installed to reduce the potential for offsite transport of waste.

NRCS, Texas

April, 2002

It is preferable to apply wastes on pastures and hayland soon after cutting or grazing before re-growth has occurred.

When feasible, reduce nitrogen volatilization losses associated with the land application of waste by incorporation within 24 hours.

Minimize environmental impact of land-applied waste by limiting the quantity of waste applied to the rates determined using the practice standard Nutrient Management (590) for all waste utilization.

Information on calibrating manure spreaders can be found in the TAEX publication No. L-5175, Managing Crop Nutrients Through Soil, Manure and Effluent Testing. Information on calibrating big gun sprinklers can be found in the Arkansas Extension publication, Calibrating Stationary Big Gun Sprinklers for Manure Application. For information on calibrating tank spreaders, traveling guns, and additional information on other manure spreading equipment see Nebraska Extension publication No. G95-1267-A, Manure Applicator Calibration.

PLANS AND SPECIFICATIONS

Plans and specifications for Waste Utilization shall be in keeping with this standard and shall describe the requirements for applying the practice to achieve its intended purpose. The waste management plan is to account for the utilization or other disposal of all animal wastes produced, and all waste application areas shall be clearly indicated on a plan map. *Any system changes should be discussed with the local Soil and Water Conservation District or USDA Natural Resources Conservation Service prior to implementation.*

OPERATION AND MAINTENANCE

Records shall be kept for a period of five years or longer, and include when appropriate:

- Quantity of manure and other agricultural waste produced and their nutrient content
- *Soil effluent, and/or manure test results*
- Dates and amounts of waste application where land applied, and the dates and amounts of waste removed from the system due to feeding, energy production, or export from the operation
- *Dates and amounts of rainfall*
- Waste application methods
- Crops grown and yields (both yield goals and measured yield)
- Other tests, such as determining the nutrient content of the harvested product
- *Record of estimated soil moisture at time of irrigation with wastewater.*
- Calibration of application equipment.
- *Additional record keeping required for operations permitted by TNRCC, or involved in programs of other agencies*

The operation and maintenance plan shall include the dates of periodic inspections and maintenance of equipment and facilities used in waste utilization. The plan should include what is to be inspected or maintained, and a general time frame for making necessary repairs.

APPROVAL AND CERTIFICATION

WASTE UTILIZATION

(Acre)

CODE 613

PRACTICE STANDARD APPROVED:

/s/ Monty Dollar	**4/17/02**
State Agronomist	**Date**
/s/ Jerry D. Walker	**4/17/02**
State Water Management Engineer	

This practice standard is needed in the _____ Field Office Technical Guide.

_____	_____
Natural Resource Manager	**Date**

CERTIFICATION:

Reviewed and determined adequate without need of revision.

_____	_____
Technical Specialist (Agronomy)	**Date**
_____	_____
Technical Specialist (Engineering)	**Date**